

REMARKS

The Examiner rejected claims 9-11 and 25-27 under 35 U. S. C. § 112, second paragraph. The Examiner cited specific instances of perceived indefiniteness. The following comments, plus the amendments to the claims contained in this response are believed to address the specific instances of indefiniteness noted by the Examiner. The Examiner rejected claims 9 and 10 as conflicting. However, claim 9 depends directly from claim 1. Claim 10 also depends directly from claim 1. These two claims recite two different options for the means for providing a variable DC voltage, namely, that it be provided separately from the ballast, and that it be formed integrally with the ballast. Thus, there is no conflict in these claims. The Examiner similarly rejected claims 25 and 26. However, claim 25 depends directly from claim 18. Claim 26 also depends directly from claim 18. Again, these two claims recite two different options for providing the variable DC voltage, namely, that it be provided by a separate module, and that it be provided by a means formed integrally with the ballast. Thus, there is no conflict in these claims. Finally, the Examiner questions whether the lamp in claim 27 is dimmable or non-dimmable. However, Applicants submit that the language of claim 27 is quite clear, namely, that the method is for converting a nominally non-dimmable lamp into a dimmable lamp. The 35 U. S. C. § 112, second paragraph rejections are therefore believed to be overcome.

The Examiner rejected claims 1-27 under 35 U. S. C. § 102. The Examiner relied upon Ranganath U. S. Patent 5,747,942 (hereinafter Ranganath) to support this rejection. With respect to claim 1, the Examiner calls Applicants' attention to Ranganath's elements 30, 10, 128 and 20, col. 12, lines 40-49, col. 5, lines 57-67 and Fig. 1A.

With respect to claim 2, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and 20 and Fig. 1A.

With respect to claim 3, the Examiner calls Applicants' attention to Ranganath, col. 3, lines 11-22, col. 8, lines 47-52 and col. 14, lines 32-42.

With respect to claim 4, the Examiner calls Applicants' attention to Ranganath, col. 3, lines 11-22, col. 8, lines 47-52, col. 11, lines 45-50 and col. 14, lines 32-42.

With respect to claim 5, the Examiner calls Applicants' attention to Ranganath's element 106 and Fig. 1A.

With respect to claim 6, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and D5, and Fig. 4A.

With respect to claim 7, the Examiner calls Applicants' attention to

Ranganath's element 106 and col. 5, lines 5-17.

With respect to claim 8, the Examiner calls Applicants' attention to Ranganath's Fig. 4A.

With respect to claim 9, the Examiner calls Applicants' attention to Ranganath's elements 105, 20, 424 and 426.

With respect to claim 10, the Examiner calls Applicants' attention to Ranganath's elements 105 and 20.

With respect to claim 11, the Examiner calls Applicants' attention to Ranganath's elements 105, 100, 424 and 426, and Fig. 4A.

With respect to claim 12, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and 128 and Fig. 1A.

With respect to claim 13, the Examiner calls Applicants' attention to Ranganath, col 3, lines 11-22, col. 8, lines 47-52 and col. 14, lines 32-42.

With respect to claim 14, the Examiner calls Applicants' attention to Ranganath, col. 3, lines 11-22, col. 8, lines 47-52, col. 11, lines 45-50 and col. 14, lines 32-42.

With respect to claim 15, the Examiner calls Applicants' attention to Ranganath's element 106 and Fig. 1A.

With respect to claim 16, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and D5 and Fig. 4A.

With respect to claim 17, the Examiner calls Applicants' attention to Ranganath's element 106 and col. 5, lines 5-17.

With respect to claim 18, the Examiner calls Applicants' attention to Ranganath's element 20 and col. 5, lines 57-67.

With respect to claim 19, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and 20 and Fig. 1A.

With respect to claim 20, the Examiner calls Applicants' attention to Ranganath, col. 3, lines 11-22, col. 8, lines 47-52 and col. 14, lines 32-42.

With respect to claim 21, the Examiner calls Applicants' attention to Ranganath, col. 3, lines 11-22, col. 8, lines 47-52, col. 11, lines 45-50 and col. 14, lines 32-42.

With respect to claim 22, the Examiner calls Applicants' attention to Ranganath's element 106 and Fig. 1A.

With respect to claim 23, the Examiner calls Applicants' attention to

Ranganath's elements 10, 126 and D5 and Fig. 4A.

With respect to claim 24, the Examiner calls Applicants' attention to Ranganath's element 106 and col. 5, lines 5-17.

With respect to claim 25, the Examiner calls Applicants' attention to Ranganath's elements 10, 126 and 20.

With respect to claim 26, the Examiner calls Applicants' attention to Ranganath's elements 10 and 20.

Finally, with respect to claim 27, the Examiner calls Applicants' attention to Ranganath's elements 126, 10, 424 and 426.

Applicants have considered all of the elements, drawings and passages from the specification noted by the Examiner, and believe that their claims, as amended herein, distinguish patentably over Ranganath. The present invention relates to the dimming control of a fluorescent lamp driven by a self-excited drive circuit. As is discussed in the BACKGROUND OF THE INVENTION AND PRIOR ART section of this application, the dimming of such lamps is often very difficult to achieve. For example, the most common conventional method of providing dimming control to a fluorescent lamp (by controlling the switching frequency) is very difficult to achieve in self-excited drive circuits (see, for example, page 3 lines 21 to 24 of the specification).

Applicants' invention provides a method of providing dimming control for such ballasts by varying the DC link voltage input to the ballast. This method can be implemented in new fluorescent lamps, or can be retrofitted to existing non-dimmable lamps to render them dimmable (see, for example, claims 9 and 27).

Based upon the Examiner's comments noted above concerning Ranganath, Applicants believe that the Examiner has misunderstood the teachings of Ranganath and as a consequence has misapplied Ranganath. In particular, Ranganath does not teach the use of a variable DC link voltage to provide dimming control. On the contrary, Ranganath uses frequency control to provide dimming control.

In a standard commercial dimmable ballast, there are four external electrical connections as shown in Fig.1 below. Two connections, namely Live and Neutral are for the AC line voltage (110V, 60Hz in the U. S.; typically 220V, 50Hz overseas). The other two connections are for DC dimming control signal, which is set within a DC voltage range of 0-10V. This 0-10V dimming voltage signal is used to set the dimming level of the ballast. A dimming voltage of 10V provides full brightness. A dimming voltage of 0V provides minimum brightness. This dimming voltage is a control voltage. It is not the dc link voltage

applied to the ballast.

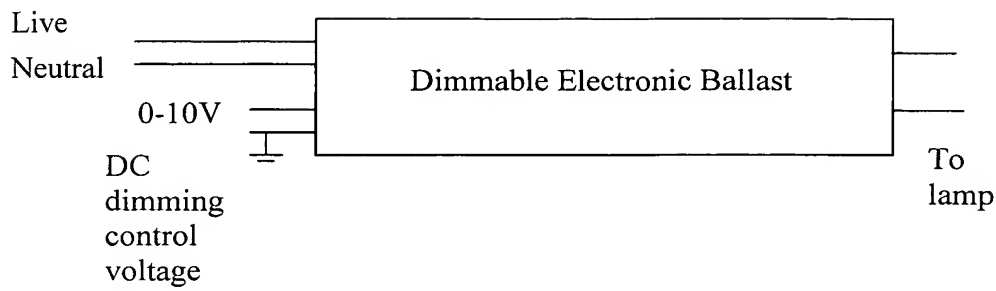


Fig.1 Typical external connections of dimmable electronic ballast.

Applicants believe that the Examiner has misunderstood the 0-10V variable DC control voltage as the variable DC link voltage in the output of the first PFC power stage (128) of Ranganath. It is very important to note that the "0V to 10V DC" described in Col. 14, Line 39 of Ranganath is NOT the voltage across (128) in Fig.1A. A standard DC voltage across (128) is of the order of 300V to 400V typically.

Ranganath makes clear that a frequency dimming control technique is used. This is described repeatedly throughout Ranganath. See, for example: col. 2, lines 24-26, 47-50 and 59-64; col. 3, lines 11-22; col. 5, lines 51-63; col. 7, lines 31-43 and 48-50; and col.13, lines 7-14. Fig. 5 of Ranganath provides very clear evidence that Ranganath uses a frequency control method and not a DC link voltage control method. Fig.5 of Ranganath shows that the lamp illumination changes with inverter frequency from about 45kHz to about 82kHz. This establishes beyond reasonable debate that Ranganath uses a prior art frequency dimming method. (In prior art commercial products, the frequency range is typically from 40kHz to 100kHz.)

Ranganath's Fig. 1 illustrates a boost (step-up) converter. The output voltage 128 of this boost converter must be higher than the peak value of the input AC line voltage. For a 220V system, the output voltage is typically set at 380V in most commercial products. Nowhere does Ranganath disclose or suggest any variation of this DC link voltage 128 as the means of dimming. On the contrary, Ranganath repeatedly describes a frequency dimming method.

Ranganath does mention other possible PFC circuits such as buck, flyback and buck-boost converter for power factor correction at, for example, col. 8, lines 47-52. However, this description is only in the context of their use for power factor correction.

There is no disclosure or suggestion in Ranganath of using such circuits or methods for dimming.

Accordingly, Applicant submits that claims 1-27, as amended herein, are now entitled to further favorable consideration, culminating in allowance. Such action is respectfully requested.

The Commissioner is hereby authorized to any fees which may be required to constitute this a timely response to the October 20, 2004 official action, to Applicants' undersigned counsel's deposit account 10-0435 with reference to file 34590-73504. A duplicate copy of this authorization is enclosed for that purpose.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Richard D. Conard", written in a cursive style.

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